

heat from the first catalyst zone to the second catalyst zone" is stated in the Action to be nowhere "disclosed" in the original specification. Reconsideration of this rejection is respectfully requested.

In the statement of the rejection the Office appears to recognize that in order to satisfy the description requirement of the first paragraph of 35 U.S.C. § 112, the original disclosure must only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question. (See the first paragraph of item (2) on page 2 of the Action). On the other hand, the statement that the limitation in question is not "disclosed" in the original specification suggests that the Office is taking the position that the subject matter in question must be explicitly described in the specification. However, an *in ipsis verbis* disclosure is not necessary to satisfy the written description requirement of section 112.

In the present case, the disclosure does reasonably convey to persons skilled in the art that the inventor had possession of a system for exhaust gas purification consisting essentially of a first catalyst zone comprising at least one catalyst containing a

catalyst component capable of reducing harmful substances in an exhaust gas; an adsorbent zone comprising at least one adsorbent capable of adsorbing said harmful substances; and a second catalyst zone comprising at least one catalyst containing a catalyst component capable of reducing said harmful substances; the first catalyst zone, the adsorbent zone and the second catalyst zone being provided in-line in an exhaust pipe of an internal combustion engine and without means for transferring heat from the first catalyst zone to the second catalyst zone. First, as noted in the Action, there is no description in the specification of a means for transferring heat from the first catalyst zone to the second catalyst zone. The entirety of the specification describes the catalyst and adsorbent zones as being provided in-line. As described on page 4, lines 4-6, an in-line exhaust system has no by-pass line in a series of the exhaust system. There is also no description or suggestion of a crossflow monolith defining the first and second catalyst zones as in WO 94/11623.

Second, the specification at page 8, lines 12-16, describes that "[w]hen an adsorbent made using such a honeycomb structure having a central hollow portion is arranged upstream of the

catalyst in an exhaust pipe, the exhaust gas passing through the hollow portion of the adsorbent warms up the downstream catalyst and raises the temperature of the catalyst earlier; ...". A person of ordinary skill in the art would understand from this disclosure that there is no means for transferring heat from the first catalyst zone to the second catalyst zone in the present invention otherwise the provision of a hollow portion in the adsorbent structure would not raise the temperature of the downstream catalyst zone earlier. Thus, when the specification in its entirety is considered, the limitation in question is believed to be "described" in the original specification in the manner required under the first paragraph of 35 U.S.C. § 112 and removal of the 35 U.S.C. § 112, first paragraph, rejection is believed to be in order.

Referring to the 35 U.S.C. § 103(a) rejections, and, first, to the rejection of claims 7-22 and 26 based on the disclosure of WO 94/11623 as the primary reference, claim 7 recites the system for exhaust gas purification of the present invention as "consisting essentially of" an adsorbent zone comprising at least one adsorbent capable of adsorbing harmful substance in an exhaust gas and a

catalyst zone comprising at least one catalyst containing a catalyst component capable of reducing the harmful substances, the adsorbent zone and the catalyst zone being provided in-line in an exhaust pipe of an internal combustion engine with the adsorbent zone being upstream of said catalyst zone with respect to flow of said exhaust gas. The "consisting essentially of" terminology excludes the first catalyst zone provided upstream of the adsorption zone required in the apparatus of WO 94/11623 because such a first upstream catalyst zone would be expected to materially affect the characteristics of the exhaust gas purification system recited in claim 7 and the claims dependent thereon.

Therefore, the proposed modification of WO 94/11623 will not result in the system for exhaust gas purification recited in the rejected claims, and the 35 U.S.C. § 103(a) rejection based on the disclosure of WO 94/11623 as a primary reference must fail.

Referring, second, to the 35 U.S.C. § 103(a) rejection of claims 7-22 and 26-28 over EP 661,098 ("EP '098") in view of WO 94/11623, the references do not support a case of *prima facie* obviousness. The position of the Office is that it would be obvious for a person of ordinary skill in the art to have used an

H/beta-zeolite having an $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio ("SAR") of 100 or more as the adsorbent in the adsorbent-catalyst disclosed in EP '098. However, obviousness requires that the art-skilled person be able to reasonably predict the results of the proposed modification. The art-skilled person could not have reasonably predicted the results of using an H/beta-zeolite having an $\text{SiO}_2/\text{Al}_2\text{O}_3$ ratio ("SAR") of 100 or more as the adsorbent in the adsorbent-catalyst disclosed in EP '098 because the only zeolite used in the examples of the adsorbent-catalysts of EP '098 is ZSM-5. Nothing is described concerning the expected results of using an H/beta-zeolite as the adsorbent of the adsorbent-catalyst. WO 94/11623 discloses nothing concerning the use of any of the adsorbents described therein as the adsorbent of an adsorbent-catalyst as disclosed in EP '098 and thus provides no basis for predicting the results of using an H/beta-zeolite as the adsorbent of the adsorbent-catalyst of EP '098. This rejection, therefore, must also fail.

Referring, third, to the rejection of claims 7-18 and 27 over EP 602,963 ("EP '963") in view of WO 94/11623, this combination of references also fails to support a case of *prima facie* obviousness

of the rejected claims for the same reasons as explained above relating to the rejection based on the combination of EP '098 and WO 94/11623. The person of ordinary skill in the art could not have reasonably predicted the results of the modification proposed by the Office. The Office has not explained why the results of the proposed modification could have been reasonable predicted.

Notwithstanding the insufficiencies of the prior art to support a *prima facie* case of obviousness of the claims of the application, submitted herewith is a declaration under 37 C.F.R. § 1.132 of Akira TAKAHASHI which provides evidence of non-obviousness sufficient to overcome any *prima facie* obviousness. The declaration compares the stability of beta-zeolites and ZSM-5 having different SAR ratios and compares the performance of the in-line system of the present invention with the "cross" system of WO 94/11623. The data show that beta zeolites having an SAR of 100 or more provide unexpectedly high thermal stability as compared to beta-zeolites having a lower SAR notwithstanding the disclosure in WO 94/11623 that preferably beta zeolites may have an SAR from at least about 25. The data also show that the in-line system of the present invention provided with beta-zeolite having an SAR of 110

or more as an adsorbent provides superior performance to that of the "cross" system of WO 94/11623 using a beta-zeolite having an SAR of 180 as an adsorbent.

It is noted that the Office states on page 9 of the Action that since WO 94/11623 recites the preferred beta-zeolite SAR ratio of 100 to 250 or 200 to 600, these would provide the same results as the instant claims. This statement is not understood. There is no question that the same zeolites will provide the same results. However, the issue is whether the results using these zeolites are unexpected. The accompanying declaration indicates that the same zeolites do not provide the same results in an in-line system and in a cross system. Moreover, WO 94/11623 discloses nothing concerning stability of the beta-zeolites. The description on page 4, lines 31-34, that useful ranges of SAR are "from about 25/1 to 1000/1, 50/1 to 500/1 as well as about 25/1 to 300/1 for example, from about 100/1 to 250/1, or alternatively from about 35/1 to 180/1" teaches nothing about the thermal stability of the beta-zeolites or other zeolites over these ranges and, in fact, to the extent that it may have any meaning, can be interpreted as suggesting that equivalent results would be expected over these

ranges. Moreover, although WO 94/11623 describes that "Beta zeolite ratio ranges¹ [are] preferably from about 200/1 to about 600/1" (Page 4, line 37, to page 5, line 1), no reason for the preference is described. Moreover, WO 94/11623 describes that, most preferably, the adsorbent material is a "low zeolite", which appears to mean a low SAR. If the Office takes the position that the results of the accompanying declaration are not unexpected, it is requested to provide specific reasoning based on the disclosure of WO 94/11623 supporting its position.

Removal of the 35 U.S.C. § 103(a) rejections is in order.

The foregoing is believed to be a complete and proper response to the Office Action dated January 21, 2003, and is believed to place this application in condition for allowance. If, however, minor issues remain that can be resolved by means of a telephone interview, the Examiner is respectfully requested to contact the undersigned attorney at the telephone number indicated below.

¹It is not clear what "Beta zeolite ratio ranges" are.

PATENT APPLN. NO. 09/524,575
RESPONSE UNDER 37 C.F.R. § 1.111

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Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attachment is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

In the event that this paper is not considered to be timely filed, applicants hereby petition for an appropriate extension of time. The fee for any such extension may be charged to our Deposit Account No. 111833.

In the event any additional fees are required, please also charge our Deposit Account No. 111833.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Page 1, first line, the reference to the related applications has been amended as follows:

--This application is a continuation of application Serial Number 08/726,468, filed ~~September 4, 1998, as a CPA of application Serial Number 08/726,468 filed October 4, 1996, now abandoned.~~--

IN THE CLAIMS:

Claims 20, 21, 22, 26 and 28 have been amended as follows:

20. (Twice Amended) A system according to claim 9, wherein said at least one adsorbent is honeycomb shaped and has a hollow central portion at which honeycomb cells are absent, said hollow central portion extending in the direction of flow of exhaust gas.

21. (Twice Amended) A system according to claim 11, wherein said at least one adsorbent is honeycomb shaped and has a hollow central portion at which honeycomb cells are absent, said hollow central portion extending in the direction of flow of exhaust gas.

22. (Twice Amended) A system according to claim 15, wherein said at least one adsorbent is honeycomb shaped and has a hollow central portion at which honeycomb cells are absent, said hollow central portion extending in the direction of flow of exhaust gas.

26. (Twice Amended) A system for exhaust gas purification, consisting essentially of:

an adsorbent zone comprising at least one adsorbent capable of adsorbing harmful substance in an exhaust gas and a catalyst zone comprising at least one catalyst containing a catalyst component capable of reducing said harmful substances, said adsorbent zone

and said catalyst zone being provided in-line in an exhaust pipe of an internal combustion engine with said adsorbent zone being upstream of said catalyst zone with respect to flow of said exhaust gas, in which system harmful substances in an exhaust gas during cold engine start up of the internal combustion engine are adsorbed by the adsorbent and the adsorbed harmful substances are desorbed from the adsorbent with a temperature rise of the adsorbent caused by the heat of the exhaust gas and are burnt on the catalyst, wherein the adsorbent contains an H/ β -zeolite having an $\text{SiO}_2/\text{AlO}_3$ ratio of 100 or more, and said adsorbent has a honeycomb shape with a hollow central portion at which honeycomb cells are absent, said hollow central portion extending in the direction of flow of exhaust gas.

28. (Amended) A system for exhaust gas purification, consisting essentially of:

a first catalyst zone comprising at least one catalyst containing a catalyst component capable of reducing harmful

substances in an exhaust gas; an adsorbent zone comprising at least one adsorbent capable of adsorbing said harmful substances; and a second catalyst zone comprising at least one catalyst containing a catalyst component capable of reducing said harmful substances; said first catalyst zone, said adsorbent zone and said second catalyst zone being provided in-line in an exhaust pipe of an internal combustion engine and without means for transferring heat from the first catalyst zone to the second catalyst zone, wherein said first catalyst zone is upstream of said adsorbent zone and said adsorbent zone is upstream of said second catalyst zone with respect to flow of said exhaust gas; in which system harmful substances in an exhaust gas during cold engine start up of the internal combustion engine are adsorbed by the adsorbent and the adsorbed harmful substances are desorbed from the adsorbent with a temperature rise of the adsorbent caused by the heat of the exhaust gas and are burnt in the second catalyst zone, wherein the adsorbent contains an H/ β -zeolite having an $\text{SiO}_2/\text{AlO}_3$ ratio of 100 or more, and said adsorbent has a honeycomb shape with a hollow

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RESPONSE UNDER 37 C.F.R. § 1.111

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central portion at which honeycomb cells are absent, said hollow
central portion extending in the direction of flow of exhaust gas.